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TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No. TEC1223

In Re Application Of: **Dan M. Manole**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/750,693	January 2, 2004	Chen-Wen Jiang	0832	3744	4112

Invention: **MODULAR HEATING OR COOLING SYSTEM**

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Dated: **July 28, 2006**

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application No.	:	10/750,693	Confirmation No. 4112
Applicant	:	Dan M. Manole	
Filed	:	January 2, 2004	
Title	:	MODULAR HEATING OR COOLING SYSTEM	
TC/A.U.	:	3744	
Examiner	:	Chen-Wen Jiang	
Docket No.	:	TEC1223-01 / C-513/540	
Customer No.:		00832	

APPEAL BRIEF

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Assistant Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This appeal is taken from the Examiner's decision dated March 7, 2006 in the above-identified patent application, finally rejecting Claims 1-3, 6, 10, and 13-16, by way of a Notice of Appeal filed on May 31, 2006.

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I. REAL PARTY IN INTEREST

The real party in interest is Tecumseh Products Company, a corporation organized and existing under the laws of the State of Michigan, having its principal place of business at 100 East Patterson Street, Tecumseh, Michigan 49286, and the assignee of the present application by virtue of an assignment from the inventor recorded on January 2, 2004 at Reel 014868, Frame 0722.

II. RELATED APPEALS AND INTERFERENCES

Neither the Appellant, the Appellants' representatives, nor the assignee know of any other appeals, interferences, or judicial proceedings which are related to, will directly affect, or be directly affected by, or have a bearing on, the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Pending:	Claims 4, 5, 7-24, and 26-30.
Canceled:	Claims 1-3, 6, 25, and 31-34.
Withdrawn:	None.
Allowed:	Claims 4, 5, 7-9, 11, 12, 17-24, and 26-30.
Objected to:	None.
Rejected:	Claims 10 and 13-16.
On Appeal:	Claims 10 and 13-16.

An Advisory Action, dated May 12, 2006, references Claims 1-24 and 26-30. However, Claims 1-3 and 6 were canceled by Applicant's Amendment After Final, filed May 31, 2006 contemporaneously with the Notice of Appeal.

Claims 10 and 13-16 stand rejected under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 6,148,635 to Beebe et al. ("Beebe '635") in view of U.S. Patent No. 6,729,383 to Cannell et

al. ("Cannell '383") in further view of U.S. Patent No. 6,687,122 to Monfarad ("Monfarad '122"). This rejection was maintained in the Advisory Action dated May 12, 2006.

This rejection is appealed.

IV. STATUS OF AMENDMENTS

Claims 4, 5, 11, and 12 were amended after the final Office Action and were rewritten in independent form to include all the limitations of the base claim and any intervening claims. The amendments were acknowledged, entered, and the Claims allowed as amended in the Advisory Action dated May 12, 2006. Claims 1-3 and 6 were cancelled after the final Office Action in an Amendment After Final, filed May 31, 2006 contemporaneously with the Notice of Appeal, in accordance with 37 C.F.R. §1.116(b)(1).

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention pertains to heating and cooling systems, particularly those for controlling the temperature of fluids, components, or items within an enclosure. The module heating and cooling system of the present invention may be used singularly, or in combination with other such modules connected in series or in parallel, to provide heating and/or cooling to a fluid medium or components within an enclosure to which the module is attached. Each module may be powered or replaced independently of any other of the modules, and provides a complete, self-contained refrigeration system unit by which heating or cooling may be effected. Each module includes a pair of cold plates having heat transfer surfaces, one from which heat is transferred to the module's refrigeration system, and the other to which heat is transferred from the module's refrigeration system. ¶ [0014].

Referring to Fig. 2, heating and cooling plates 22, 24, which function as first and second heat exchangers, are located on opposing sides of module 20 and are rigidly attached to a frame. ¶ [0029]. Plates 22, 24 include exteriorly facing heat transfer surfaces 26, 28, respectively. Disposed between and connected to plates 22, 24 to form a fluid circuit are hermetic refrigerant

compressor 44, refrigerant receiver 48, and expansion device 50. ¶ [0029] - [0030]. Working fluid is received through the fluid circuit by refrigerant compressor 44 at low, substantially suction pressure. The working fluid is compressed by refrigerant compressor 44 to a high, substantially discharge pressure, increasing the temperature of the working fluid. Once compressed, the working fluid exits refrigerant compressor 44 and continues to travel through the fluid circuit. ¶ [0029]. The heated working fluid is circulated to plate 22 and the heat of the working fluid dissipated by surface 26. The working fluid than travels through an expansion device, which further cools the working fluid. ¶ [0031]. The now cooled working fluid is circulated to plate 24 where heat is transferred to surface 28 and absorbed by plate 24 and the working fluid. ¶ [0032]. Because of the design of module 20, simply reversing the relative orientation of module 20 with respect to the enclosure allows both heating and cooling functions to be achieved, i.e., surface 26 or surface 28, respectively, may be placed in contact with the enclosure. ¶ [0033].

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Independent Claim 10, and Claims 13-16 which depend therefrom, stand rejected under 35 U.S.C. § 103(a) as being obvious over Beebe '635 in view of Cannell '383 in further view of Monfarad '122.

VII. ARGUMENT

Independent Claim 10 calls for a refrigeration system module comprising, *inter alia*, a heating plate; a cooling plate; an expansion device disposed between the heating and cooling plates; and a hermetic compressor assembly comprising a housing, an electric motor, and a compression mechanism, the compressor assembly *disposed between* the heating and cooling plates.

Advantageously, the placement of the hermetic compressor assembly between the heating and cooling plates allows for the heating and cooling plates to occupy substantially all of an exterior side of the module. This allows for not only better utilization of the available exterior

surface, but also facilitates a more efficient transfer of thermal energy.

Applicant respectfully submits that independent Claim 10 is not rendered obvious over Beebe '635 in view of Cannell '383 in further view of Monfarad '122. Beebe '635 discloses heat transfer device 8, shown in Fig. 1, having condenser 10, compressor 14, and evaporator 17. Compressor 14 is formed by top compressor wafer 14a, flexible diaphragm 14b, and bottom compressor wafer 14c. Electrical stimulation of diaphragm 14b compresses refrigerant within compressor 14, forcing it through a closed loop defined between compressor 14, condenser 10, and evaporator 17. The design of Beebe '635 is an improvement over the "well known vapor-compression cycle cooling technology [which] poses serious structural impediments to size reduction that, for the most part, have yet to be overcome." Col. 1, lines 28-30.

In overcoming the structural impediments of the typical compressor assembly, Beebe '635 provides the above-described compressor design utilizing a "microcooling approach, i.e. localized cooling as differentiated from macrocooling of a large environment." This approach allows the heat transfer device of Beebe '635 to have a "physical embodiment similar to integrated circuit packaging", with overall dimensions of 100 mm by 100 mm by 2.75 mm. Col. 2, lines 18-19; col. 4, table 1. In contrast to the "microcooling" provided by the heat transfer device of Beebe '635, conventional systems occupy much larger volumes to provide "macrocooling." These systems, according to Beebe '635, are "highly efficient, but awkward and heavy, relegating their use to a very limited number of applications." Col. 1, line 67-col. 2, line 2.

In addition to size, distinctions between "macrocooling" and "microcooling" systems are further shown by comparison of other aspects of typical compressor assemblies, such as the assembly of the current application, to the heat transfer device of Beebe '635. Typical compressor assemblies consume hundreds to thousands of watts of power and weigh tens to hundreds of pounds. In contrast, the heat transfer device of Beebe '635 consumes *three watts* of power and weights *forty grams*. Id. As a result, the "macrocooling" of a large environment, such as the interior of the cabinet shown in Fig. 3 of the current application, could not be achieved by the "microcooling" heat transfer device of Beebe '635. Further, typical compressor assemblies are hermetic, i.e., airtight. However, the heat transfer device of Beebe '635 is not hermetic because with "use of the invention over long periods of time, refrigerants under

pressure may eventually be lost to the surroundings due to the permeability of the material and the subsequent diffusion of the high pressure gases through the polymer walls." Col. 10, lines 27-31.

Since Beebe '635 fails to disclose the use of a hermetic compressor assembly as required by independent Claim 10 and moreover strongly teaches away from the claimed compressor assembly, the Examiner relies on Monfarad '122. While Monfarad '122 discloses a hermetic compressor assembly, the compressor 12, shown in Figs. 3 and 4 of Monfarad '122, is located adjacent condenser 14 and evaporator 20, i.e., the heating and cooling plates. Monfarad '122 does not explicitly or implicitly disclose disposing the compressor assembly between the heating and cooling plates as required by independent Claim 10.

An obviousness rejection under 35 U.S.C. §103(a) "can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art" as admitted by the Examiner in the Advisory Action dated May 12, 2006. Not only does Monfarad '122 lack a teaching, suggestion, or motivation to modify the teachings of the cited art to produce the claimed invention, Monfarad '122 teaches away from combining a hermetic compressor with the compact refrigeration systems of Beebe '635 and Cannell '383.

A disclosed advantage of Monfarad '122 is to create a "compact" system, col. 3, line 49, that can be sized to "fit within a rack unit of a conventional computer server or a telecommunications rack." Col. 9, lines 6-7. Placement of the compressor between the heating and cooling plates would necessarily require increasing the distance from one heat exchanger to the other. This increased distance between condenser 14 and evaporator 20, shown in Figs. 3 and 4 of Monfarad '122, would increase the size of the unit, preventing it from fitting within several of its intended applications. Accordingly, a person having ordinary skill in the art would recognize from the figures and disclosure the intended applications of Monfarad '122. Such recognition by a person having an ordinary skill in the art creates a clear disincentive to place the hermetic compressor between the heating and cooling plates.

In the Examiner's Office Action, dated March 7, 2006, finally rejecting Claims 10 and 13-16, the Examiner cited column 2, lines 19-22 of Monfarad '122 and stated, "Monfarad

discloses the size and design of prior art cooling system [sic] often required the major components cooling system be centrally located." Page 4, Office Action dated March 7, 2006. The Examiner then relied on the above-identified citation in a manner incompatible with the entire disclosure of Monfarad '122, i.e., that Monfarad '122 acknowledges designing refrigeration system modules with the "major components" between the heating and cooling plates. When read in its entirety, Monfarad '122 does not disclose disposing a hermetic compressor between the heating and cooling plates of a refrigeration system module. In fact, the entire sentence of Monfarad '122, only a portion of which was quoted by the Examiner, states, "In addition, the size and design of prior art liquid-based cooling systems often required that the major components of the prior art liquid-based cooling system be centrally located, **typically remote from the electronic devices to be cooled, and that a complicated system of tubing or 'plumbing' be used to bring the cooling liquid into thermal contact with the heat source, i.e., with the microprocessor, multi-chip module, or other integrated circuit**." Col. 2, lines 16-26. Further, Monfarad '122 continues, "Consequently, unlike prior art air-based cooling systems, prior art liquid-based cooling systems were not modular, were not self-contained, and often required special expertise and tools for maintenance and operation." Col. 2, lines 26-29.

When taken in context, Monfarad '122 simply identifies a problem in the prior art, i.e., the need to locate major components of a liquid-based cooling system a significant distance from the devices to be cooled. The portion of Monfarad '122 cited by the Examiner does not provide motivation to dispose a hermetic compressor assembly between the heating and cooling plates of a refrigeration system module as required by independent Claim 10. In fact, the entire disclosure of Monfarad '122 further emphasizes its compact design. This compact design allows the module of Monfarad '122 to be "self-contained and . . . have physical dimensions similar to . . . air-based cooling systems" that, as a result, avoid "the need for significant system housing modification or the 'plumbing' associated with prior art liquid-based cooling systems." Col. 3, lines 17-23. Disposing the hermetic compressor assembly between the heating and cooling plates of Monfarad '122 would cause the module to exceed the physical dimensions of air-based cooling systems, which, as discussed above, would make the module incompatible with several of its intended applications. Additionally, disposing the compressor assembly between the heating and cooling plates of Monfarad '122 would require the same "significant system housing

modification" that the compact design of Monfarad '122 seeks to avoid. Col. 3, line 21. Therefore, the disclosure cited by the Examiner, when taken in context, further teaches away from combining the hermetic compressor of Monfarad '122 with the compact refrigeration systems of Beebe '635 or Cannell '383 by furthering the disincentive to place the hermetic compressor of Monfarad '122 between the heating and cooling plates, as discussed above.

Further, Applicant agrees with the Examiner's observation that the use of the word "typically", with respect to the location of the major components of the prior art liquid-based cooling system being "typically remote from the electronic devices to be cooled", does not *require* that the major components be remote from the electronic devices to be cooled. Advisory Action dated May 12, 2006, page 2; Monfarad '122, col. 2, lines 18-26. In fact, Monfarad '122 is itself a refrigeration module in which the major components of the cooling system are located within the vicinity of, and are not "remote from", the electronic devices to be cooled. Col. 3, lines 35-47. However, simply stating the *typical* location of components of the prior art systems does not disclose, explicitly or implicitly, positioning the components in any other location. Therefore, while the disclosure of Monfarad '122 does not explicitly preclude all possible locations for the major components of a liquid-based cooling system by *requiring* that the major components be positioned "remote from" the devices to be cooled, Monfarad '122 does, for the reasons set forth above, teach away from disposing the compressor assembly between the heating and cooling plates as required by Claim 10.

Even assuming, *arguendo*, that Monfarad '122 discloses a hermetic compressor assembly disposed between a heating and cooling plate, the use of a hermetic compressor assembly with the heat transfer device of Beebe '635 would be in contravention of the teachings of Beebe '635. Beebe '635 is specifically designed to overcome the "structural impediments" of the "awkward and heavy" compression systems typically used in cooling applications, i.e., the type of hermetic compressor assembly used in Monfarad '122. Col. 1, line 29; col. 2, line 1. Further, the benefit of localized "microcooling" of a single component or an extremely small area provided by Beebe '635 would be eliminated. To utilize a hermetic compressor in conjunction with the heat transfer system of Beebe '635 would effectively create a "macrocooling" system, the antithesis of the cumulative teachings of Beebe '635. Therefore, a person having ordinary skill in the art would lack the teaching, suggestion, or motivation required by 35 U.S.C. §103(a) to combine the heat

transfer device of Beebe '635 with the hermetic compressor assembly of Monfarad '122.

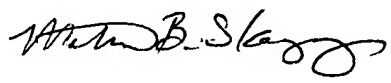
Finally, Cannell '383 and Beebe '635 cannot overcome the deficiencies of Monfarad '122, as neither Cannell '383 nor Beebe '635 disclose a hermetic compressor assembly.

Because the combination of Beebe '635, Cannell '383, and Monfarad '122 do not disclose or suggest all the limitations of independent Claim 10, Applicants respectfully submit that independent Claim 10, and Claims 13-16 which depend therefrom, are not rendered obvious by the combination of these references.

VIII. CONCLUSION

Appellant respectfully requests reversal of the Examiner's rejection, and allowance of the claims.

Respectfully submitted,



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MATTHEW B. SKAGGS, REG. NO. 55,814
Name of Registered Representative

Signature

July 28, 2006
Date

IX. CLAIMS APPENDIX

10. (original): A refrigeration system module, comprising:

a frame;

a heating plate having a fluid inlet and a fluid outlet and a first heat transfer surface;

a cooling plate having a fluid inlet and a fluid outlet and a second heat transfer surface;

an expansion device disposed between said heating and cooling plates and in fluid communication with said heating plate fluid outlet and said cooling plate fluid inlet; and

a hermetic compressor assembly comprising a housing, an electric motor and a compression mechanism, said compression mechanism being driven by said motor, said compressor assembly disposed between said heating and cooling plates and having a discharge outlet in fluid communication with said heating plate fluid inlet, and a suction inlet in fluid communication with said cooling plate fluid outlet;

wherein said heating plate, said cooling plate, said expansion device and said compressor assembly are fixed to said frame, and said first and second heat transfer surfaces each at least partially define an exterior surface of said module.

13. (original): The module of claim 10, further comprising a refrigerant receiver interconnecting said heating plate fluid outlet and said expansion device.

14. (original): In combination with the module of claim 10, a cold plate having a third heat transfer surface in conductive communication with one of said first heat transfer surface and said second heat transfer surface, said cold plate having a fluid inlet and a fluid outlet.

15. (original): In combination with the module of claim 10, a conductive heat exchange plate having a third heat transfer surface in conductive communication with one of said first heat transfer surface and said second heat transfer surface, said conductive heat exchange plate having a plurality of fins.

16. (original): The combination of claim 15, wherein said third heat transfer surface and said one of said first heat transfer surface and said second heat transfer surface are of matching areas.

X. EVIDENCE APPENDIX

None.

XI. RELATED PROCEEDINGS APPENDIX

No proceedings which are related to, will directly affect or be directly affected by, or have a bearing on, the Board's decision in the pending appeal are known to the Appellants', the Appellants' representatives, or the assignee.